potential.

Claim ~~63~~ 27. A system as set forth in claim ~~62~~ 26 wherein said system includes a coaxial cable through which said signals from said generating means are supplied to said switching means.

Claim ~~64~~ 28. A system as set forth in claim ~~63~~ 27 wherein said source of potential is applied through said coaxial cable to said dipole.

Claim ~~65~~ 29. A system as set forth in claim ~~64~~ 28 including constant current means coupled through said coaxial cable and said dipole for regulating current, charging current, to said dipole through said third and fourth resistances.

Claim ~~66~~ 15. A system as set forth in claim ~~39~~ 7 wherein a said template signal is generated responsive to a received signal of said received signals.

REMARKS

Claims 1-14 and 21-38 have been cancelled, claims 15 and 20 have been amended, and claims 39-66 have been added.

Claim 15 has been amended to make clear that it is a portion of the generated signal, or signals, which has a generally stepped amplitude. This feature is explained in the first complete paragraph on page 17 where it is stated that in between the triggering effect, the antenna is charged with a voltage. Then, transistor 100 is switched "on," and it shorts the antenna. Thus, the voltage to the antenna, or radiator, drops to essentially zero. After this would occur recharging. Thus, it is only a portion of

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the signal which is a generally stepped-in-amplitude portion.

With respect to the feature of "generally stepped," applicant does not contend that this feature is new. The IEEE article referenced on page 2 of the application makes such a feature apparent.

Although Cook does not specifically use the term "generally stepped," he asserts that his thyratron switch provides a rise time of 1.8 millimicroseconds (or nanoseconds), and applicant would acknowledge that this would be regarded as a generally stepped wave function. Applicant notes on page 16 a comparable rise time in his device, e.g., one nanosecond or less for a particular antenna.

Claim 15 has been further amended to clarify that the receiving means receives "burst signals from said medium." Thus, there is now a definite limitation with respect to this aspect of the claim.

Claim 15 has been still further amended to make clear the novel combination of the receiving means, wherein:

(1) it coherently detects received signals;

(2) it separately integrates received (that is, burst) signals of (1) (this language is chosen to differentiate from a simple integration of a continuing signal input);

(3) a number of the separately obtained signals by (2) are then integrated.

By this technique, only input signal energy which is the subject of coherent detection is integrated, and such is subject to two integrations.

In citing the Robbins patent, the Examiner has, in the judgment of the applicant, cited the basic pertinent known prior art relating to the reception of wideband, baseband, burst signals, including those that are interval modulated, which is true for applicant's system and the system disclosed in British Patent 581,811 (which the undersigned learned of within the past two weeks). To this might be added gated or windowed threshold detection (if the Examiner is interested, a later Robbins patent, Patent 3,858,204, deal with this). Whether straight or gated, threshold detection detects those signals which are observed as being present when their amplitude rises above a selected level.

To go back a bit, it is well to bear in mind that with wideband burst communications, there is no frequency tuning wherein one can exclude, or, reciprocally, not adversely affect, existing signals from conventional services such as radio broadcasts, television, or other communications signals which are present nearly everywhere and nearly all of the time. Thus, the problem is a two-way street. If one transmits a broadband burst signal with sufficient amplitude as to be detectable by a threshold detector, or gated detector, it is typically of sufficient amplitude to interfere with existing radio services, and this, of course, cannot be tolerated. Thus, by its very nature, burst signals must be of a low, non-interfering level, typically below general noise levels for a real world system.

Thus, the problem, how do you detect a signal which is below the noise level, would appear essentially impossible. This

conclusion, it is submitted, is reinforced by the fact that although wideband burst signal communications has been suggested since the mid 1940s, until applicant's solution, the detection problem as disclosed here and in the parent applications has long existed. Why? While one can only conjecture, it is believed that there was not seen the missing link, that being that coherent detection, with important other combination of circuitry, could provide a solution. With respect to any attempt to operate coherent detection, it is believed that this failure is attributable to the nature of wideband burst signals which have millions of different frequencies and phases. Any notion of coherence with such would seem almost imponderable.

Applicant would acknowledge that coherent detection has been employed for envelope detection, for detection of relatively long sequences of sine waves where certain of them have their phase reversed (referred to as direct sequencing), and there is assumed that there have been other uses. In none that the undersigned is aware of has there been coherent detection of discrete baseband entities such as that of a burst signal. In the case of envelope detection, hundreds of thousands of sine waves have been employed to make up an individual pulse whose position is detected by coherent detection, but the individual sine waves are obliterated during filtering. In the case of direct sequencing, the sequence, hundreds of thousands of sine waves are observed as a group and coherently examined, and thus there is no discrete examination of a cycle (if the Examiner is interested, there is a system disclosed

in U.S. Patent 4,527,276 which illustrates pulse-envelope coherent detection with pulse position).

In any event, applicanat submits that in none of the prior art systems is there disclosed the three-step process performed as claimed in claim 15.

While it is believed that the Examiner in allowing claim 15, contingent upon clearing up certain connective matters, appreciated the novelty of this claim, applicant wishes to amplify its novelty as above because of its phenomenal achivement.

With the amendment above of claim 20 to make its language in basic accord with claim 15, from which it indirectly depends, it is believed that claims 16-20 are clearly allowable for the reasons set forth above with respect to claim 15.

Applicant has cancelled claims 12-14 to make a single lineage of claims dependent either directly or indirectly on claim 15.

Added claim 39 spells out that the coherent detection of claim 15 employs a template generator and multiplier to which the template signal and received signals are fed to provide a product signal which marks the accomplishment of coherent detection. This claim is thus believed allowable for the reasons set forth above with respect to claim 15 and for the further definition provided by claim 39.

Claim 40 provides explicitly for certain structure of the transmitter of claim 15, spelling out a source of potential and that the transmitter further includes a switch which abruptly changes the potential on the radiator. Thus, it is submitted that

claim 40 is clearly allowable based upon the combination of structure set forth in claims 15 and 40.

Claim 41 adds to claim 40 the definition of the radiator as a particular form of dipole and is believed allowable for the reasons set forth above.

Claim 42 importantly adds to the system of claim 15 that the time spaced signals are varied in a time pattern, a feature which adds to the novelty and importance in that it very significantly provides a way of making the transmitted burst signals more difficult to detect by an unintended receiver.

Claim 43 adds to claim 42 the feature that the variance of claim 42 may be a function of modulation, such being discussed in the second complete paragraph on page 6 of the specification and identified on page 11, line 8.

Claim 44 claims that there be three of the receiving means, enabling the directionality of a target to be determined. Clearly, this claim makes up a combination not suggested by the prior art.

Claim 45 adds to claim 15 filtering for determining frequencies of a received signal and thereby, inherently, velocity information with respect to a target, a combination not disclosed by the art.

Claim 46 more particularly details the receiving means of claim 15 to include a dipole antenna, and it is believed allowable for the reasons set forth above with respect to claim 15.

Claim 47 provides that the template signal set forth in claim 39 be generated subsequent to the transmitting of a burst signal,

this being inherently the case whether the template signal is generated responsive to the burst signal from the transmitter or medium (see first complete paragraph on page 6). It is believed clearly patentable over the art for the reasons stated above.

Claim 48 adds to claim 39 that the template signal is delayable (page 13, commencing at line 9). This, of course, enables the template signal to be moved in time, and, for example, to reach and then move in accordance with the time of received burst signals. It is believed that this combination is clearly patentable for the reasons set forth above.

Claim 49 adds to claim 39 that which is illustrated by Fig. 13 wherein two template signals are generated, one being delayed with respect to the other. Then separate multipliers multiply the received signals by the two template signals. Two products are then separately short-term integrated and thereafter long-term integrated and combined. Clearly, no such combination is disclosed by the prior art.

Claim 50, which is dependent upon claim 49, simply specifies that the second integration occurs, as illustrated, before the combining function. Again, there is no suggestion of this in the prior art.

Claim 51, which is dependent upon claim 39, provides that the template signal be of a discrete polarity. This is particularly significant in that this enables it to be a simple D.C. signal, sweeping aside the complex notion of what would appear required for coherent detection of wideband burst signals. This feature enables

a polarity coherence with reflected signals, enabling effective the integrational steps.

Claim 52, which is dependent upon claim 39, spells out a radar function wherein a set of discrete template signals are generated, each discretely following transmitted burst signals, whereby from a set of the resulting intelligence signals, a target, and its range, is discernable. It is from the set there will be built up a significant signal, if there is a target present, in the presence of noise. That is, by virtue of the detection of a target, there will probably occur like polarities of signal for each returned burst of a set of returns. Such then provides integratable signals. Noise, on the other hand, typically provides random polarities and will thus integrate to zero or near zero. Thus, even though individual signals may be below noise level, in their aggregate they provide intelligence. This is a significant feature of this invention. Clearly, this claim is allowable.

Claim 53, which is dependent upon claim 52, spells out that the short-term integration occurs for the first integration step and lasts only for the period of the template signal, thus spelling out its short-term effect and thus ignoring signal energy received between target reflected bursts. This thus spells out the providing of (2) of claim 15. In addition, this claim makes clear that the next steps as the results of (2) are integrated to provide (3) of claim 15. Clearly, no such teaching is disclosed by the prior art.

Claim 54, which is dependent upon claim 40, spells out that

the change in potential applied to the radiators is one which is of reduced potential, being effected by the switching means. Clearly, the combination of claims 54, 40, and 15 is not suggested by the prior art.

Claim 55 provides that the switching means of claim 40 is a light responsive switch, and in this combination, there is clearly no suggestion of it in the prior art.

Claim 56 provides that the material of the switching means of claim 55 is diamond. Again, there is no suggestion of this combination in the prior art.

Claim 57 spells out that to the combination of 57 is added a source of potential applied to the dipole antenna and that a switch abruptly changes the potential on the antenna. Clearly, this is not disclosed by the art, taking into account the combination as a whole.

Claim 58 is dependent upon 57, and it spells out that the applied switched source of potential is applied at points on the elements intercepted by line between the apices of the elements, thus as specifically shown in several of the drawings, including Fig. 6. Such is not suggested by the art.

Claim 59 is dependent upon claim 41 and particularly spells out that the antenna is planar and that there are a plurality of like dipoles. This would, of course, be in contrast to a log periodic antenna wherein the elements are not alike but are of different length.

Claim 60, which is dependent upon claim 59, adds a reflector

to the plurality of dipoles of claim 64, and there is no showing in the art that would disclose such a combination, taking into account the structure of the dependent claims from which claim 64 totally depends.

Claim 61 spells out in some detail the drive circuitry to the antenna is provided wherein it is specified that the switching means is connected to the poles of the dipole through discrete resistances. It is to be noted in Cook that while an apparent charging voltage is supplied to the antenna through a single resistance, the switching means, the coaxial thyratron switch, is not coupled to the elements of the antenna through resistance. By employing such resistances, the applicant can terminate the shorted antenna via resistance of a value related to the characteristic impedance of the antenna and thus prevents adding to the antenna a condition which distorts, disperses in terms of frequency, frequency compositions of the signal, an undesirable feature. Clearly this claim is patentable.

Claim 62, which is dependent on claim 61, adds two charging resistances, one for each element, in contrast to a single charging resistance as shown by Cook. For this and other reasons present in the combination of this claim as set forth in the prior claims, upon which is depends, this claim is clear of the art.

Claim 63, which is dependent upon claim 62, spells out that the switching means is supplied a triggering signal through a coaxial cable. While in Cook there is a coaxial configuration between the switch and antenna, there is no indication of a

switching means via a coaxial cable. Thus, this claim is believed clearly allowable.

Claim 64 is dependent upon claim 63 and spells out that the source of potential to the dipole is applied through the coaxial cable. This claim is believed allowable for the reasons set forth with respect to the combination made up of claim 63 and the depending claims as a whole.

Claim 65 is dependent upon claim 64 and spells out that the dipole antenna is charged by a constant current through resistances, being charging resistances. Clearly, there is no suggestion of this technique, as illustrated in Fig. 11, by any of the references.

Claim 66, which is dependent upon claim 39, spells out that the template signal is responsive to a received signal as disclosed on page 6 at line 8. It is believed that this claim is clear of the art.

For the reasons set forth, it is believed that the claims now in the case are allowable; accordingly, it is requested that this case be reconsidered and be passed to issue.

Applicant herewith petitions the Commissioner of Patents and Trademarks to extend the time for response to the Office Action mailed on September 18, 1992, to two months from December 18, 1992, to February 18, 1993. Submitted herewith under a separate transmittal letter is a check for $180.00 to cover the cost of the extension.

If there are any questions, or in the event that the Examiner

believes an interview with the undersigned would help resolve any issues still remaining, the undersigned would very much appreciate receiving a telephone call from the Examiner.

Respectfully submitted,

By _____

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Enc.